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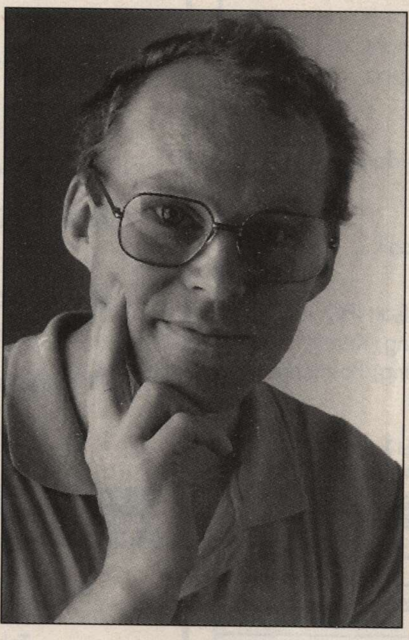
steve PATIENT



Some interesting work is going on in robotics these days, causing developments that will eventually effect all computing systems, including PCs. In the Insect Lab at the Massachusetts Institute of Technology, Rodney Brooks' team is busy designing tiny robots.

The behaviour of these machines is directed not by one massive program (the traditional Turing Machine approach), but by a number of small Finite State Machines (FSMs). These are tiny programs which only have knowledge of one aspect of the whole insect and act independently.

A group of FSMs constitutes both the nervous system and the program that controls an ‘insect's’ behaviour. A fairly large number is needed – five for each leg in one very simple ‘insect’ that walks on six stilts. The upside of this is that FSMs are relatively inexpensive.

Each of these tiny machines seeks to achieve a stable state. To do this, it responds to information coming in from other FSMs and sensors, and then alters whatever particular condition it is responsible for. One FSM can change something another considered to be in a stable state, but at this point it will labour to achieve a new equilibrium.

The good news is that all this really works extraordinarily well. An untrained ‘insect’ might have FSMs that act to make it move forward and escape the light, for example. Random twitches rapidly give way to organised behaviour as the higher-level FSMs learn which outputs cause the input they're looking for and so on, all the way down the chain. In fact, complex behaviour patterns can arise even from relatively simple examples of these tiny machines.

We're not talking about artificial intelligence here, unless you rate an earwig as bright – more a case of artificial stupidity. But is intelligence required? These creatures exhibit behaviour patterns complex enough for observers to think of them as animals rather than simply as machines, and that's more than my PC ever manages.

Desktop PCs now have vast amounts of computing power available, yet they exhibit no behaviour at all. In fact, they don't do much of anything unless they're told to, and then they just run on in a tedious and predictable way. Couldn't some of that power be put to work making the PC a bit more interesting?

Of course, such a computer would need more inputs and outputs than the more familiar PC. At the very minimum, it would require senses, ways of detecting people, light, heat and so on. In practice, it should also be capable of using various combinations of bolt-on goodies which would enable it to gather information and respond appropriately. However, best of all it could have remotes – ‘insects’ of its own to act as its hands and eyes.

This is all very interesting, but what would be the aims of such a PC? Well, that at the very least is predictable. If the manufacturers want you to buy one, you'll need to know that it will always be your friend and serve you. It will have to recognise you by some identifiable electronic analogue of smell. Its remote will lie in wait for your footsteps, and upon detecting them it will pass on the information. This PC, which for the sake of convenience we will call Spot, must be friendly and knowing you're nearby, it will attempt to attract your attention.

Spot could simply comment on the weather, its infra-red detectors noting the overcast sky, or dance around and beg for PP9 batteries. In fact, it will do whatever it has discovered works.

This friendly little computer will also know just what you like to do at different times. For instance, if you spend your leisure hours running simulations of the Brighton Belle, Spot will flash a picture of that wonderful woman on screen (OK, so it's a train).

The wonderful thing about all this is that Spot's actions are always geared towards you. It will behave quite differently with a stranger. It'll be wary of him and refuse to respond to his overtures, perhaps reacting to a strange hand on its keyboard with ‘No keyboard detected – press F1 to continue’.

Nevertheless the machine's actions will never be predictable, for it must continue to alter as you change. All the responses will be taken into account as it attempts to achieve its very own nirvana.

Spot exists to please you. It wants you to control it and force it to run software. If this behaviour sounds familiar, it's because people look for the same things in their pets. ●

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